

The Industrial Revolution



Cottage Industry

Prior to the Industrial Revolution, and even during its early years, entrepreneurs provided poor families with raw materials for spinning, weaving, and garment making in their own homes. Early 19th-century print of English family sewing uniforms for the British army under the domestic, or putting-out, system that preceded the factory system.



**“Putting Out”
System**

***Fun for the
whole family!***

Problems

Difficult to supervise
rural workers

SOLUTION:
Factory Production

beginnings

Britain c. 1750

Historians:
*Was there an
Industrial
“Revolution”?*



Why Britain?

Natural Advantages

- **Lots of Rivers**
 - Cheap, easy transportation
 - Water power
- **Coal**
- **Iron**
- **Sheep**
(imported in 16th century)



Why Britain?

Human Advantages

- **National Bank**
 - **Chartered 1694**
 - **No NB in France**
 - **Source of *capital***
- **Private Property Rights**
- **Aristocrats invested in commerce/industry**
 - **Not so in France**
- **Canals**
- **Invention**



Why Britain???



Natural Advantages

Rivers

Coal

Iron

Sheep

Human Advantages

Canals

Free Market Economy

Capital

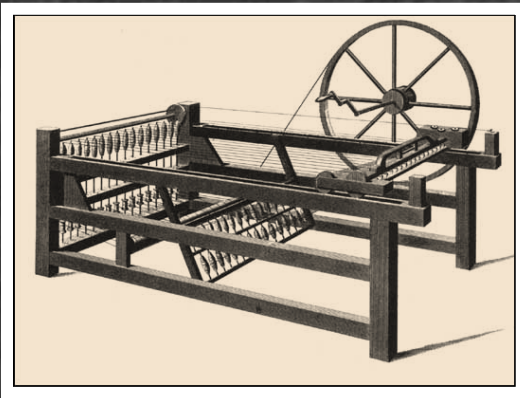
National Bank

Private Property Rights

Enclosures

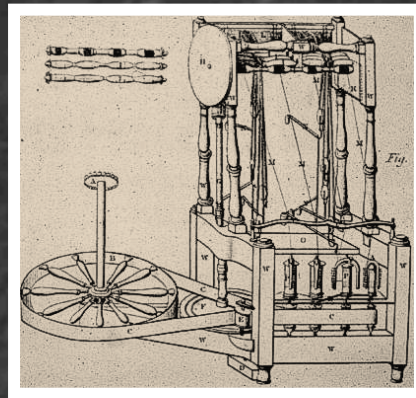
Inventions of the Industrial Revolution

Spinning Jenny



**James
Hargreaves
1764**

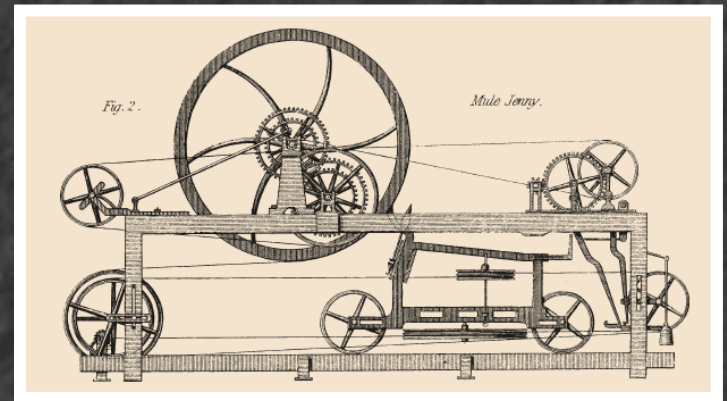
Water Frame



**Richard
Arkwright
1768**

Inventions of the
Industrial
Revolution 

Spinning Mule

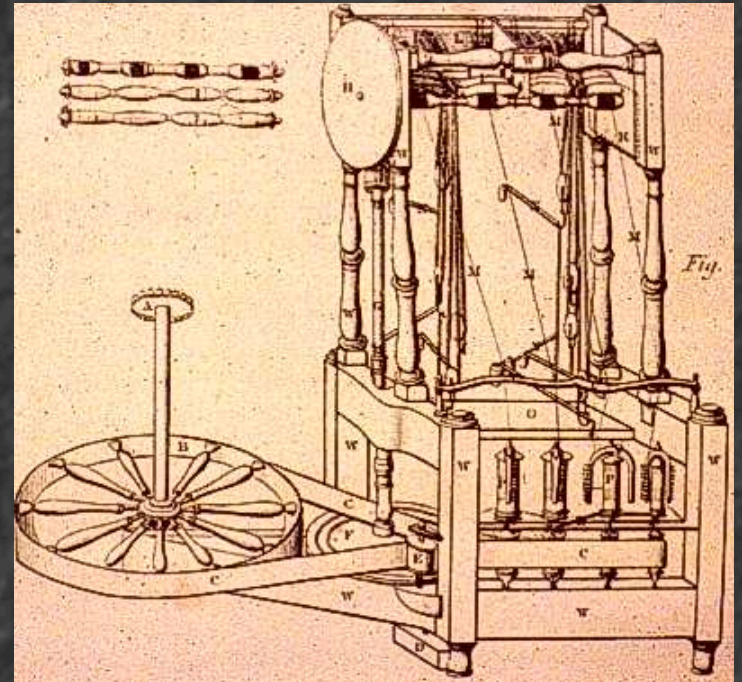


**Samuel
Crompton
1779**

Water Frame

Richard Arkwright - 1768

Held several hundred
spindles and required
water power to operate



MILLS



The **Water Frame** could not be operated from home.

Mills, housing ~~thousands~~ dozens of water frames, were built near **rivers**.

A scenic view of a river flowing through a lush green forest, with mountains in the background. The river is in the foreground, flowing from the bottom left towards the right. The forest is dense and green, covering the hillsides. In the background, there are mountains and a valley. The sky is blue with some clouds.

Water Power

Water power is *finite* – only so many water frames could be built, and only by major rivers.

Goods still produced on a small scale in the countryside.

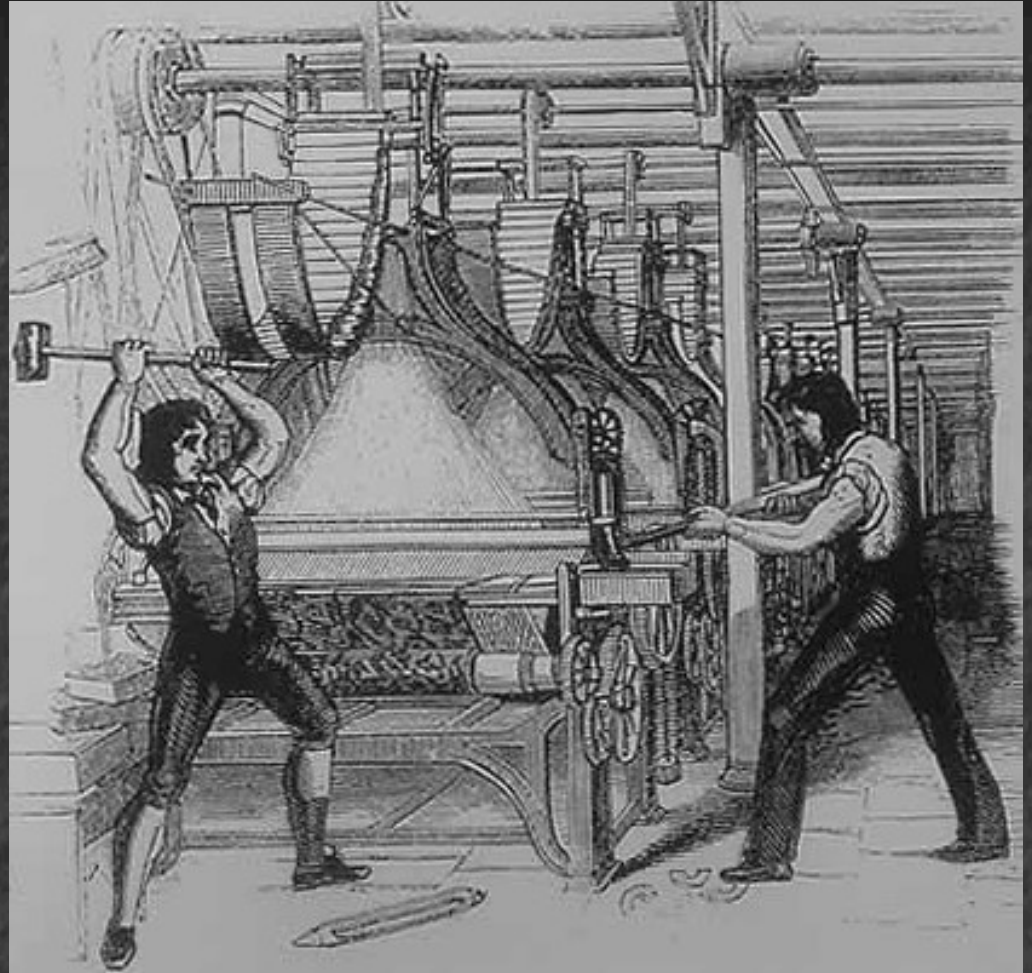
Luddites

Ned Ludd

Mythical forest dweller

Luddites smashed frames that made automated weaving possible.

Modern Usage:
Anti-technology





Smashing
is what Luddites do best!

Coal

The British had access to **coal**, which provided massive amounts of energy in comparison to water, but it was still *finite*.

Photo by [peterp](#)

University of Glasgow

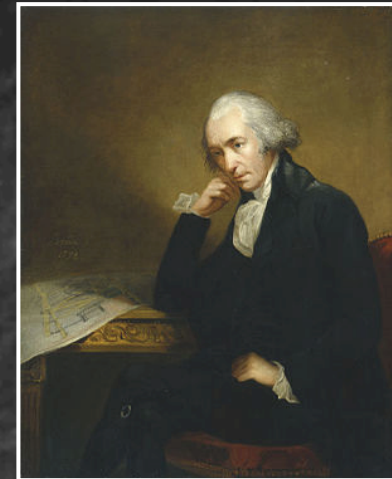


Scottish universities emphasized science and the mechanical arts.

Oxford and Cambridge emphasized theology and the humanities.

Steam Engine

| | |
|--------------|--|
| 1705 | First experimental steam engine invented |
| 1769 | James Watt (U. of Glasgow) made the existing steam engine (which was being used at Scottish universities for experiments) more efficient. |
| 1770s | Steam engine becomes a major producer of power. |



Watt



A preserved Watt engine at Loughborough University



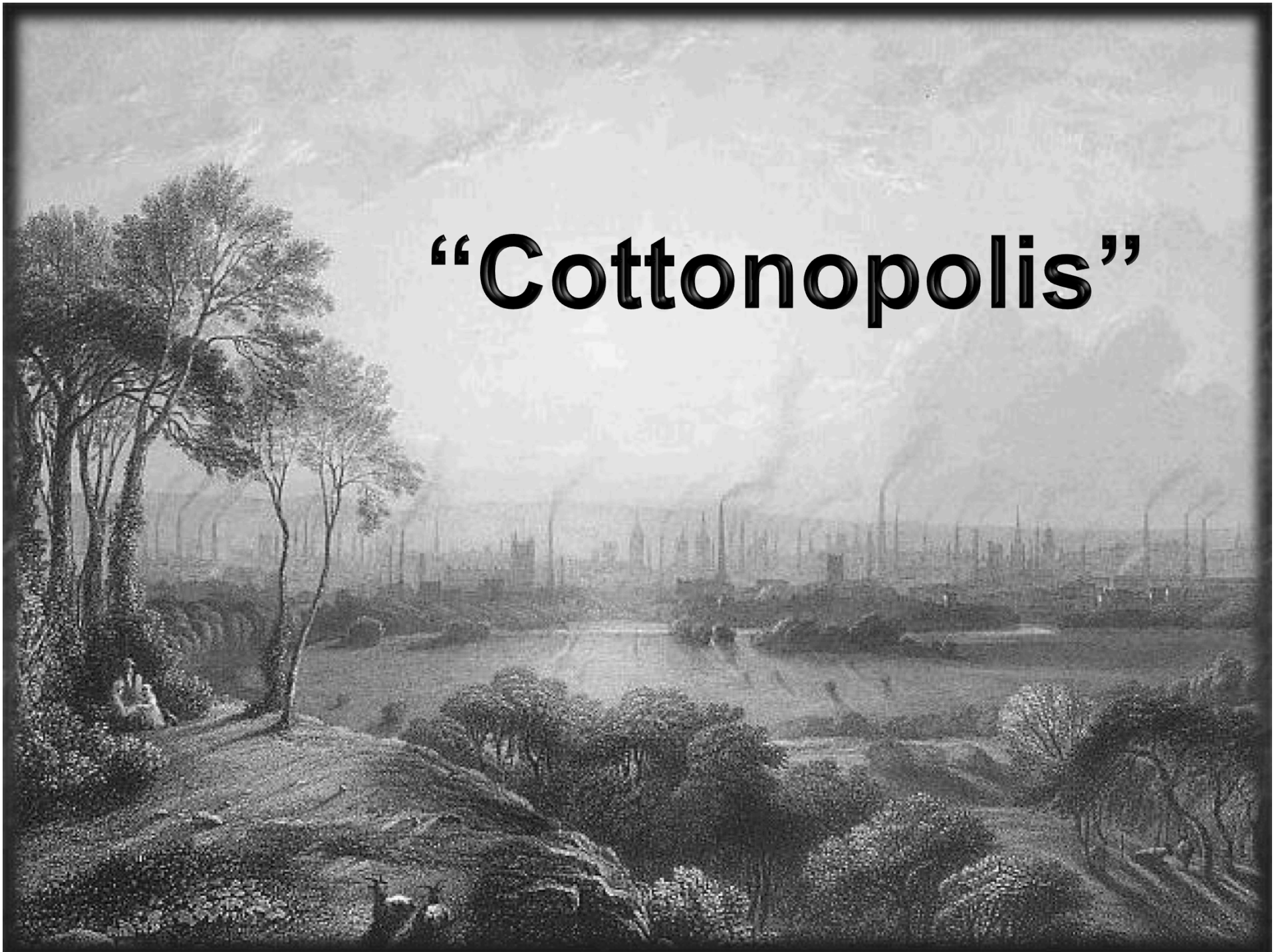
Cities

A black and white photograph of a dense industrial cityscape, likely Manchester or Liverpool, featuring numerous tall factory chimneys and buildings along a river. The image is hazy, suggesting a smoggy atmosphere. The river is in the foreground, and the city extends into the background with many tall buildings and chimneys.

The development of the steam engine allowed people to build factories *anywhere.*

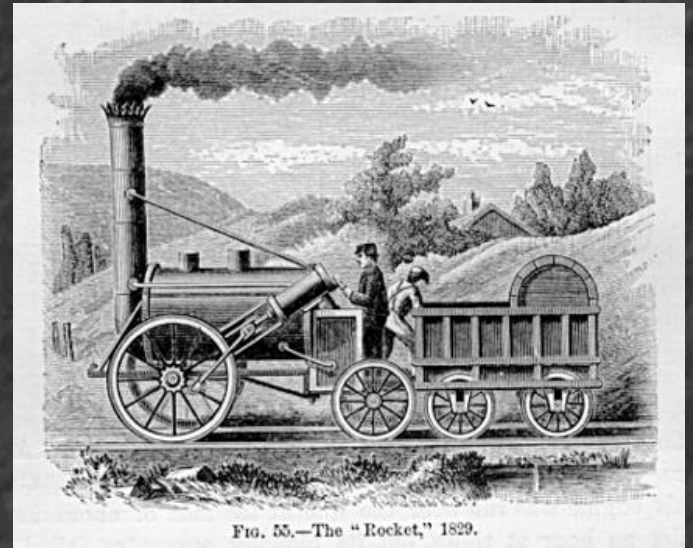
Many factories popped up in cities, such as **Manchester** and **Liverpool.**

“Cottonopolis”



Railroads

Transportation of goods was still a problem until railroads were developed.

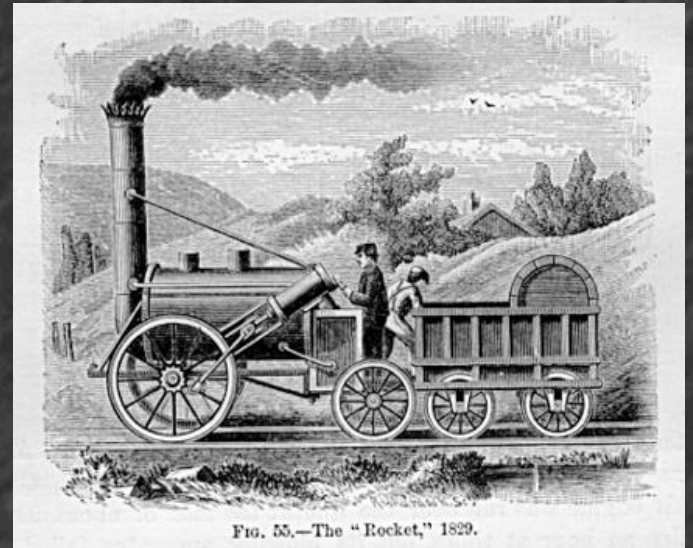


1825 – Liverpool to Manchester Railway

1830 – The *Rocket* clocked a record 16 MPH.

Railroads

Goods can now be produced *and* transported in mass quantities.



A Foreign Traveler's Perspective



Alexis de Tocqueville

- *Journeys to England and Ireland*
- Visiting Manchester

WILL THINGS GET
BETTER?

The Dismal Science

Economic Pessimism



Thomas Malthus
1766-1834



David Ricardo
1772-1823

The Malthusian Dilemma



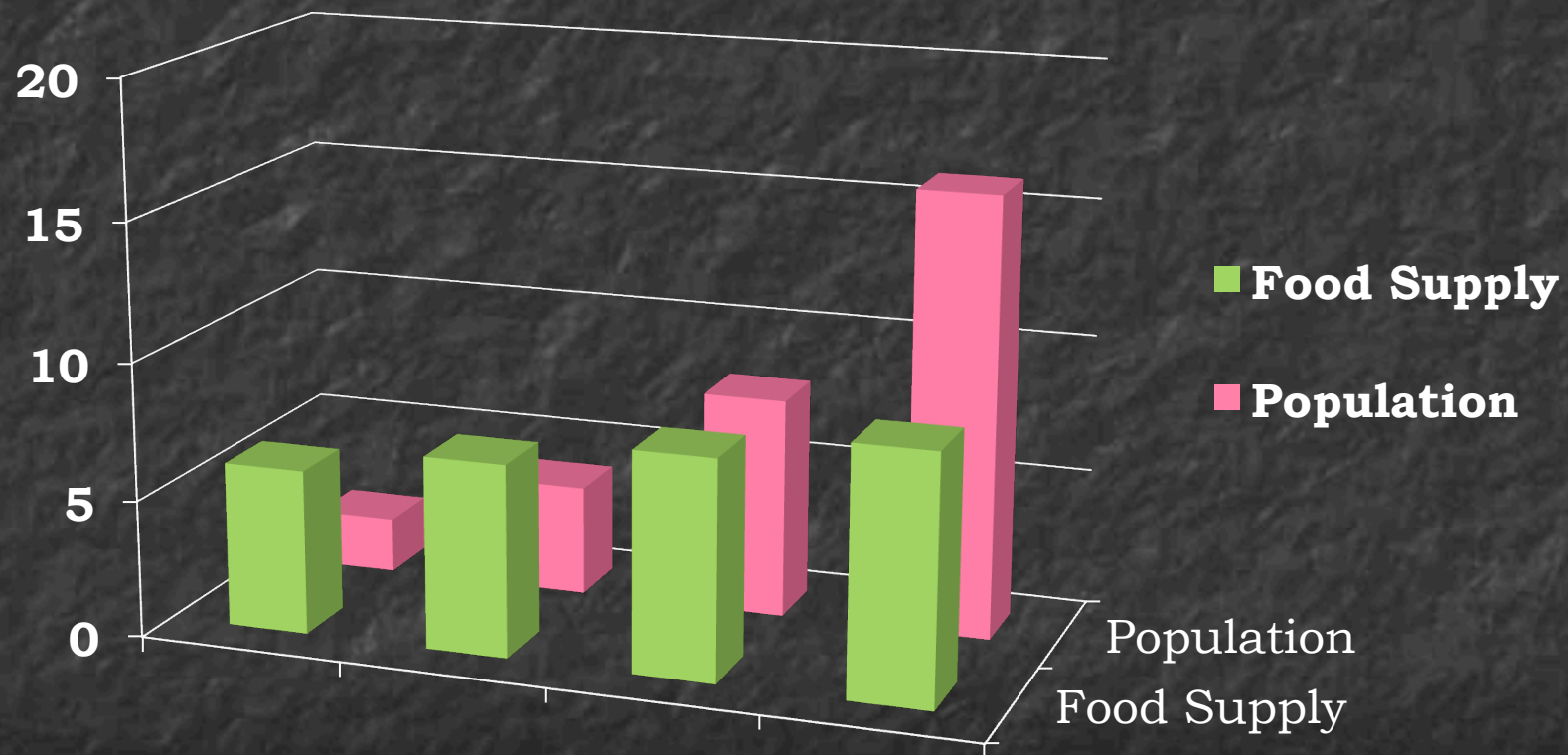
Thomas
Malthus
1766-1834

Thomas Malthus,

*Essay on the Principle of
Population (1798)*

Food supply growth is
arithmetic, but population
growth is *geometric*.

The Malthusian Dilemma



Production Possibilities frontier

As technology advances, so does our capacity to produce.



Graph Credit: [Everlong](#)

Iron Law of Wages



David
Ricardo
1772-1823

Wages (in the long-term) will always tend toward the ***subsistence**** level.

****what is needed to survive***

Iron Law of Wages



David
Ricardo
1772-1823

Things are

NOT

going to get
better.

correct

SHORT-TERM



Thomas Malthus
1766-1834



David Ricardo
1772-1823

incorrect

LONG-TERM



Thomas Malthus

1766-1834



David Ricardo

1772-1823

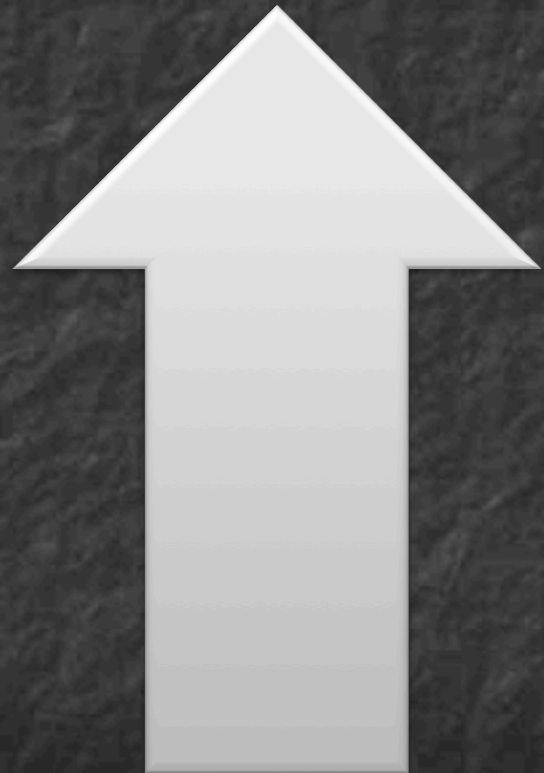


Things DID get better.

Photo by André Zahn

Standard of Living

- **Depends on Time Period**
 - 1820's, 1830's, 1850's...
- **Momentary shock, but conditions improved**





LEARNING. DELIVERED.

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